MULTIMEDIA UNIVERSITY

STUDENT ID NO

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# MULTIMEDIA UNIVERSITY

# FINAL EXAMINATION

**TRIMESTER 1, 2022/2023 (TERM ID 2210)**

## DPJ5531 – PROGRAMMING IN JAVA

( All sections / Groups )

17 FEBRUARY 2023
9.00 am – 11.00 a.m
(2 Hours)

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**INSTRUCTIONS TO STUDENTS**

1. This Question paper consists of 4 pages with 3 Questions only.
2. Answer **ALL** questions. The distribution of the marks for each question is given.
3. Please write all your answers in the Answer Booklet provided.

## SECTION A: STRUCTURED QUESTION (20 MARKS)

### QUESTION 1 [10 MARKS]

a) Given these values:

```
int x=14, y=6, z=5, w;
```

- Evaluate the following expressions.
- Show your workings clearly.

***NOTE:** The expressions are NOT RELATED to each other.*

i) `w = x % z / ++y + (y - x--)` [2 marks]

ii) `w = z * (y-- - --y) + x / y` [2 marks]

b) Answer the following questions:

i) Referring to *Figure 1*, write a `static` method named `CalcPyramidVol` that calculates the volume of a pyramid using the following formula:

$$Volume\ of\ Pyramid = \frac{l\,w\,h}{3}$$

This method has three `double` parameters, which are:

- l – length of the pyramid base
- w – width of the pyramid base
- h – the height of the pyramid

This method will return a `double` value which is the volume of the pyramid.

[4 marks]

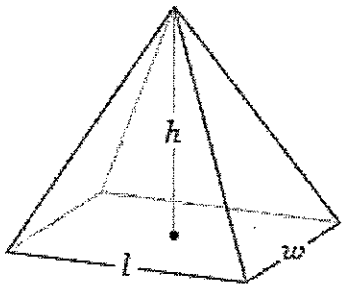


*Figure 1: The pyramid*

ii) Write a statement to call the method you created in b) i). [2 marks]

**Continued .....**

## QUESTION 2 [10 MARKS]

Answer the following questions:

a) Write a Java code to create a two-dimensional array named `weightLoss` that will store two trainees' weight loss (kg) each month for three months. [2 marks]

b) Based on your answer in a), write a nested for loop statement to get and store user input in the array `weightLoss`. [8 marks]

**Note:**

- Do not write a complete program; write only the loop statements.
- Assume the following statement is already added to the program:

```
Scanner console = new Scanner(System.in);
```

- Refer to the sample output.

**Sample Output:**

```
Enter 3 months weight loss for Trainee 1:
2
1.2
0.5
Enter 3 months weight loss for Trainee 2:
0.3
1.5
1
```

**Continued .....**

## SECTION B: APPLICATION QUESTION (20 MARKS)

## QUESTION 1 [20 MARKS]

Based on the UML class diagram in *Figure 2*, write the Java program that helps a trainee to be assigned to a trainer with the correct expertise based on the chosen program.

You are only required to write the codes for two classes, which are class `Trainee` and an application class named `TestGymUser` to run the program.

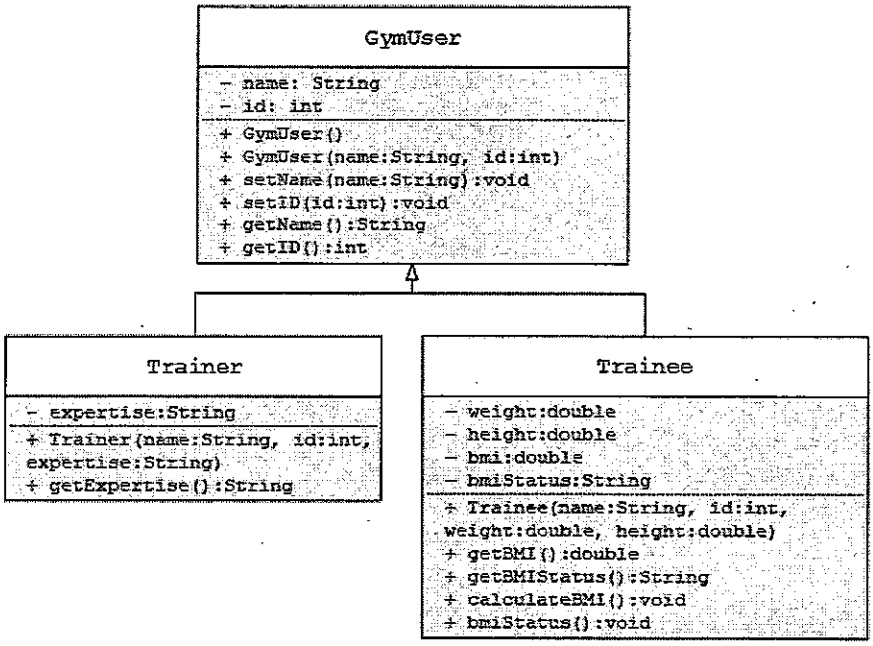


*Figure 2: UML class diagram*

Based on the description above, answer the following questions:

class `Trainee`:

- Declare the data fields based on the UML class diagram [1 mark]
- Create the constructor and accessor methods based on the UML class diagram. [3marks]
- Create the `calculateBMI()`. This method will calculate the *BMI* of the trainee using the formula: *bmi = weight / (height x height)* [1 mark]
- Create the `bmiStatus()`. This method will determine the *BMI status* of the trainee based on the BMI. Refer to the table below: [3 marks]

| BMI | BMI Status |
|---|---|
| Less than 18.5 | Underweight |
| 18.5 – 24.9 | Normal |
| 25 – 29.9 | Overweight |
| 30 and above | Obesity |

**Continued .....**

class `TestGymUser`:

- In the `main()`, create an array of class `Trainer` objects named `trainerObj` of size 2. [2 marks]
- For each object, initialize it with the following values: [1 mark]

| | |
|---|---|
| `Trainer` object 1 | Trainer name: Amy<br>Trainer ID: 762938<br>Expertise: Weight Loss |
| `Trainer` object 2 | Trainer name: John<br>Trainer ID: 892764<br>Expertise: Muscle Gain |

- Display the details of the trainer on the output screen. [2 marks]
- Get the details of the trainee by asking for the trainee's *name*, *ID*, *weight* (kg) and *height* (m). Then, create an object of class `Trainee`, passing in the trainee's details. [1.5 marks]
- Call the necessary methods to display the trainee's *BMI* in 3 decimal places and the *BMI status*. [3 marks]
- Ask the user to enter the *program* that they want. User can enter either "Weight Loss" or "Muscle Gain". Then, based on the chosen program, assign and display the suitable trainer for the trainee. [2.5 marks]

Write your program based on the sample output below.

**Sample Output 1:**

```
Details of trainers
-------------------------------
===Trainer 1===
Name: Amy
ID: 762938
Expertise:Weight Loss

===Trainer 2===
Name: John
ID: 892764
Expertise:Muscle Gain

Enter the details of the trainee
-------------------------------
Name   : Kimberly
ID     : 928371
Weight (kg): 67
Height (m): 1.50
Your BMI is 29.778 (Overweight)
Program to subscribe: Weight Loss

Assigned Trainer: Amy
```

**Sample Output 2:**

```
Details of trainers
-------------------------------
===Trainer 1===
Name: Amy
ID: 762938
Expertise:Weight Loss

===Trainer 2===
Name: John
ID: 892764
Expertise:Muscle Gain

Enter the details of the trainee
-------------------------------
Name   : Tommy
ID     : 772839
Weight (kg): 55
Height (m): 1.76
Your BMI is 17.756 (Underweight)
Program to subscribe: Muscle Gain

Assigned Trainer: John
```

***Bold statements are input from user***

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